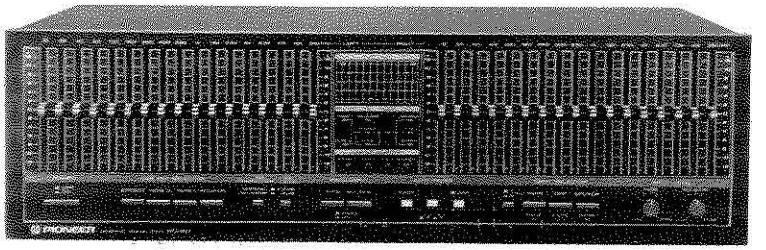
Operating Instructions

GRAPHIC EQUALIZER
SG-90



(Photograph shows BLACK finished model.)

Thank you for buying this Pioneer product.
Please read through these operating instructions and then you will know how to operate your model properly. After you have finished reading the instructions, put them away in a safe place for future reference.
These operating instructions are based on the model KU, and they can be used for the KC, HEM, HB, YP, S, S/G models. The differences between the models are given below.

KU and KC models:
For U.S.A. and Canada ('KU' or 'KC' stamped on packing case): power line voltage is a.c. 120 volts.

HEM model:
For Europe ('HEM' stamped on packing case): power line voltage is a.c. 220 volts ~.

HB model:
For U.K. ('HB' stamped on packing case): power line voltage is a.c. 240 volts ~.

YP model:
For Australia ('YP' stamped on packing case): power line voltage is a.c. 240 volts ~.

S and S/G models:
For destinations excluding above (S or S/G stamped on packing case); A 2-point (~ a.c. 110/120/220/240 volts) voltage selector switch is provided.

[For KC model]

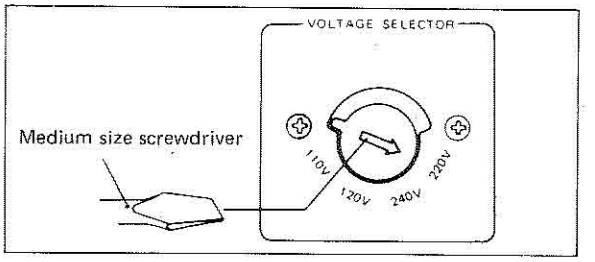
CAUTION: TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

ATTENTION: POUR PREVENIR LES CHOCS ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

LINE VOLTAGE SELECTOR SWITCH

Only S and S/G models are provided with this switch but KU, KC and other models (HEM, HB, YP) are not provided with this switch.
You will find the line voltage selector switch on rear panel. This switch has positions for 110V, 120V, 220V and 240V power sources. Before your model is shipped from the factory, the switch is set to the power requirements of the destination; nevertheless, you should check that it is set properly before plugging the power cord into the AC outlet. If the voltage is not properly set or if you move to an area where the voltage requirements differ, adjust the selector switch as follows. Before adjusting disconnect the power cord.

1. Prepare a medium size screwdriver.
2. Insert the screwdriver into the arrow on the voltage selector and adjust so that the tip of the arrow points to the voltage value of your area.



IMPORTANT NOTICE [For KU and KC models]

The serial number for this equipment is located on the rear panel. Please write this serial number on your enclosed warranty card and keep in a secure area. This is for your security.

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

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PIONEER®

SAFETY INSTRUCTIONS

READ INSTRUCTIONS — All the safety and operating instructions should be read before the appliance is operated.

RETAIN INSTRUCTIONS — The operating instructions should be retained for future reference.

HEED WARNING — All warnings on the appliance and in the operating instructions should be adhered to.

FOLLOW INSTRUCTIONS — All operating and use instructions should be followed.

WATER AND MOISTURE — The appliance should not be used near water — for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.

LOCATION — The appliance should be installed in a stable location.

WALL OR CEILING MOUNTING — The appliance should not be mounted to a wall or ceiling.

VENTILATION — The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.

HEAT — The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.

POWER SOURCES — The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

POWER-CORD PROTECTION — Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

POLARIZATION — If your purchased product is provided with a polarized power plug, please read the following instructions. This product is equipped with a polarized alternating current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.

CLEANING — The appliance should be cleaned only with a polishing cloth or a soft dry cloth. Never clean with furniture wax, benzine, insecticides or other volatile liquids since they may corrode the cabinet.

POWER LINES — An outdoor antenna should be located away from power lines.

NONUSE PERIODS — The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.

OBJECT AND LIQUID ENTRY — Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

DAMAGE REQUIRING SERVICE — The appliance should be serviced by Pioneer authorized service center or qualified service personnel when:

- The power-supply cord or the plug has been damaged; or
- Objects have fallen, or liquid has been spilled into the appliance; or
- The appliance has been exposed to rain; or
- The appliance does not appear to operate normally or exhibits a marked change in performance; or
- The appliance has been dropped; or the enclosure damaged.

SERVICING — The user should not attempt to service the appliance beyond that described in the operating instructions. For all other servicing, contact the nearest Pioneer authorized service center.

OUTDOOR ANTENNA GROUNDING — If an outside antenna is connected to the antenna terminal, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges.

In the U.S.A. section 810 of the National Electrical Code, ANSI/NFPA No. 70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Fig. A.

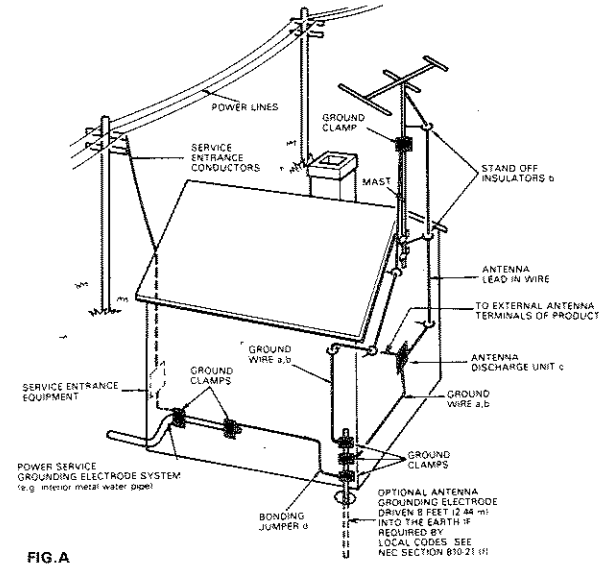

POWER LINES
GROUND CLAMP
SERVICE ENTRANCE CONDUCTORS
MAST
STAND OFF INSULATORS b
ANTENNA LEAD IN WIRE
TO EXTERNAL ANTENNA TERMINALS OF PRODUCT
GROUND WIRE a,b
ANTENNA DISCHARGE UNIT c
GROUND CLAMPS
SERVICE ENTRANCE EQUIPMENT
GROUND WIRE a,b
GROUND CLAMPS
POWER SERVICE GROUNDING ELECTRODE SYSTEM (e.g. interior metal water pipe)
OPTIONAL ANTENNA GROUNDING ELECTRODE DRIVEN 8 FEET (2.44 m) INTO THE EARTH IF REQUIRED BY LOCAL CODES SEE NEC SECTION 810-21 (f)
BONDING JUMPER d

FIG.A

a) Use No. 10 AWG (5.3 mm²) copper, No. 8 AWG (8.4 mm²) aluminum, No. 17 AWG (1.0 mm²) copper-clad steel, bronze wire, or larger as ground wire.

b) Secure antenna lead-in and ground wires to house with stand-off insulators spaced from 4 feet (1.22 meters) to 6 feet (1.83 meters) apart.

c) Mount antenna discharge unit as closely as possible to where lead-in enters house.

d) Use jumper wire not smaller than No.6 AWG (13.3 mm²) copper or equivalent when separate antenna-grounding electrode is used.

IMPORTANT 1

The lightning flash with arrowhead, within an equilateral triangle, is intended to alert the user of the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

CAUTION:
TO PREVENT THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

IMPORTANT 2

If the apparatus is fitted with AC mains power outlet(s), see REAR PANEL FACILITIES for convenient connection of additional Hi-Fi component(s). Make all connections to the AC outlet(s) and the signal terminals first. Connect the plug to the wall socket last, make sure that the power switch is off. Disconnect the wall plug when the equipment is not in regular use, e.g. when on vacation.

FOR USE IN THE UNITED KINGDOM

The wires in this mains lead are coloured in accordance with the following code:

Blue:	Neutral
Brown:	Live

WARNING: This plug must only be connected to electronic apparatus equipped with suitable sockets.
Otherwise cut off and dispose of the plug, and fit an appropriate one in accordance with the instructions below.

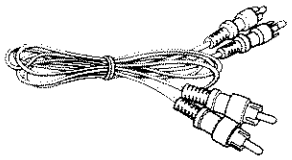
As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured marking identifying the terminals in your plug proceed as follows:

The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.

The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

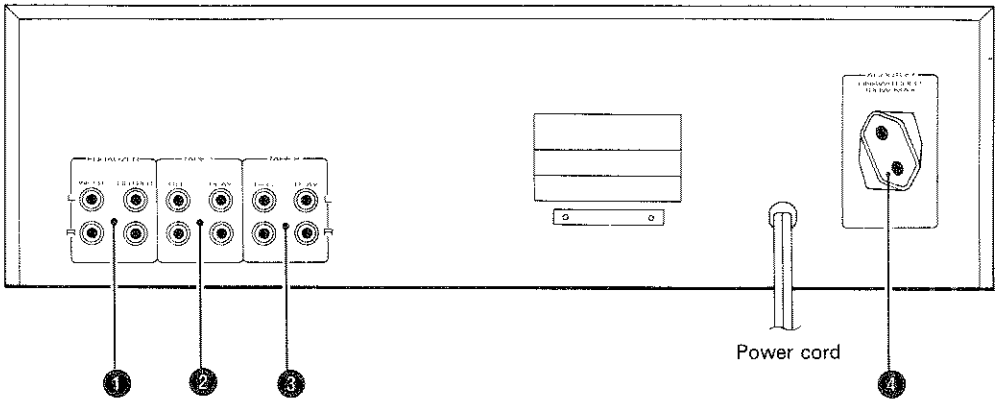
REAR PANEL FACILITIES AND CONNECTIONS

Two pin-plug cords are included as accessories. These are to be used to connect the sound processor to your stereo amplifier. The white plug is for the left channel, and the red plug is for the right channel.



Pin plug cords (2)

There are two pin-plug cords, one black, and one gray, for use in connecting the input and output systems.



❶ EQUALIZER INPUT/OUTPUT TERMINALS

These are input/output terminals for connecting the stereo amplifier to the unit.
Connect to the stereo amplifier's TAPE terminals or ADAPTOR/TAPE 2 terminals.

❷ TAPE 1 TERMINALS

These are used for connecting a tape deck to the unit. Use these terminals when connecting a single tape deck to the unit.

❸ TAPE 2 TERMINALS

These are used for connecting a tape deck to the unit. Use these terminals and the TAPE 1 terminals when connecting two tape decks.

NOTE:
TAPE 1 and TAPE 2 terminals are used when you use a double deck. For the connection with a double deck, refer to page 5.

❹ AC OUTLET (UNSWITCHED TOTAL 100 W MAX)

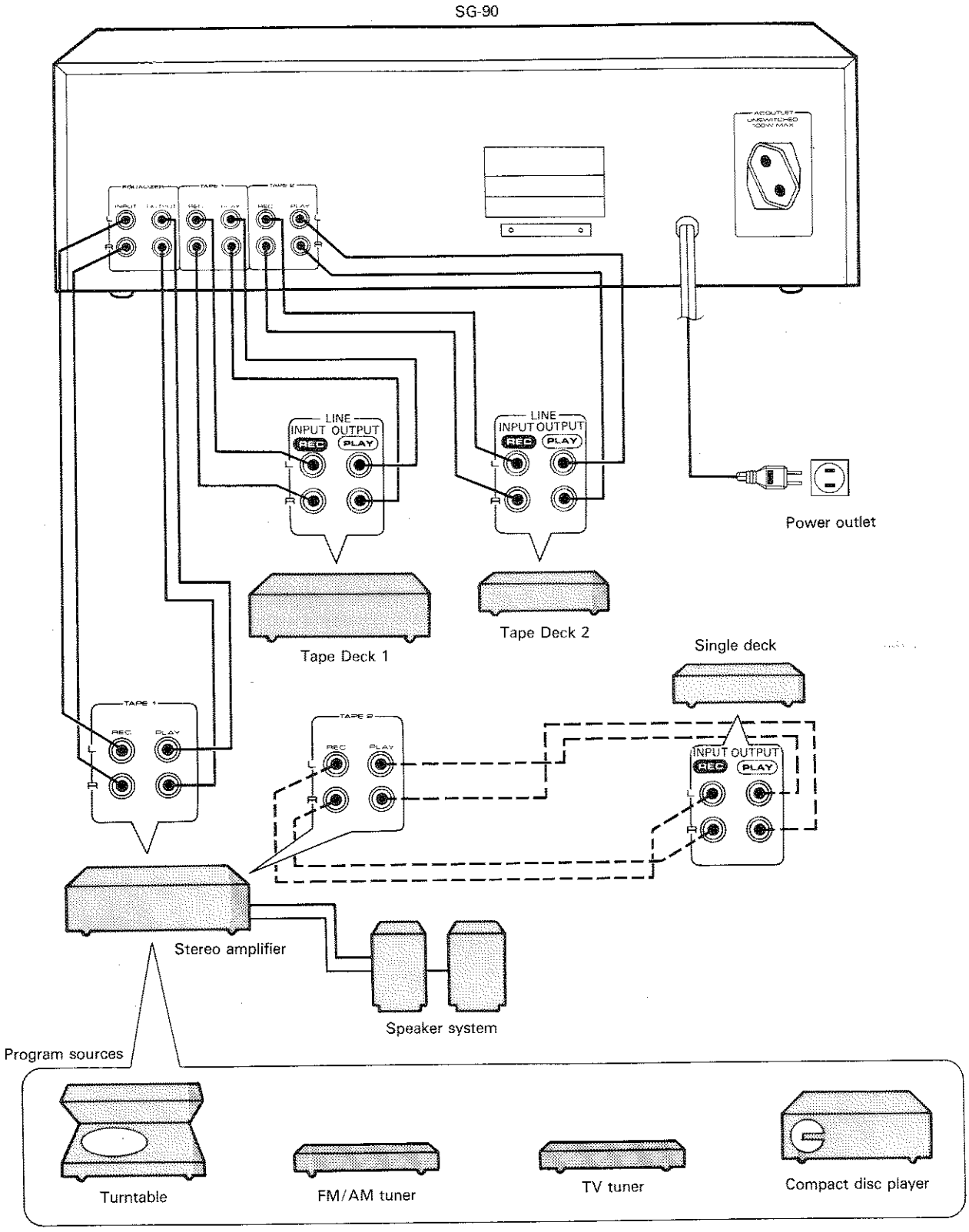
Power flows continually to these outlets, regardless of whether the amplifier is switched ON or OFF. Electrical power consumption of the connected equipment should not exceed 100 W.
The equipment should be disconnected by removing the mains plug from the wall socket when not in regular use, e.g. when on vacation.

NOTE:
Do not connect appliances with high power consumption such as heaters, irons, or television sets to the AC OUTLET, in order to avoid overheating or fire risk. This can cause the amplifier to malfuncion.

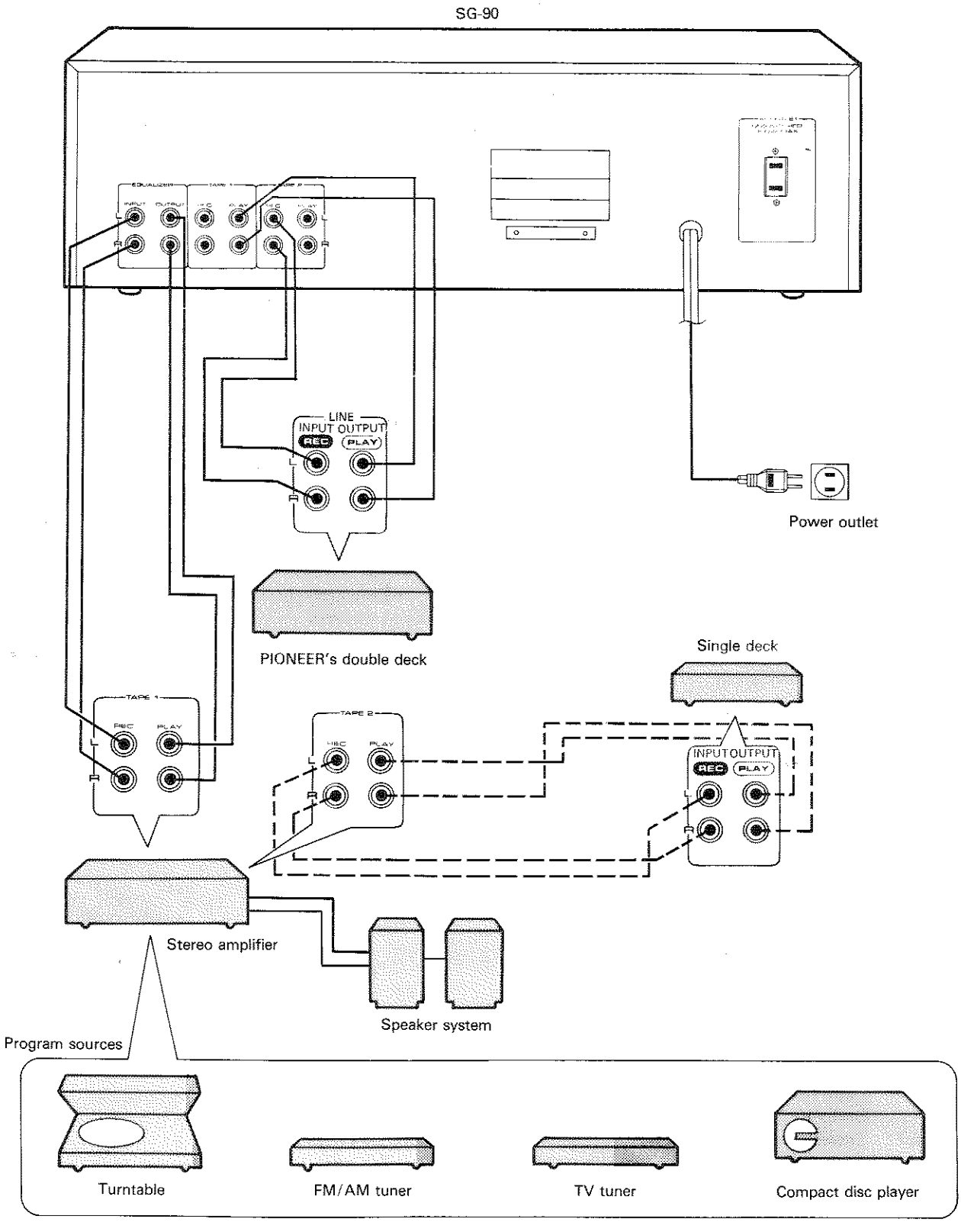
Any mention of a "double deck" in these instructions is a reference to the double cassette deck made by PIONEER.

Refer to pages 4 and 5 for more details on the connections.

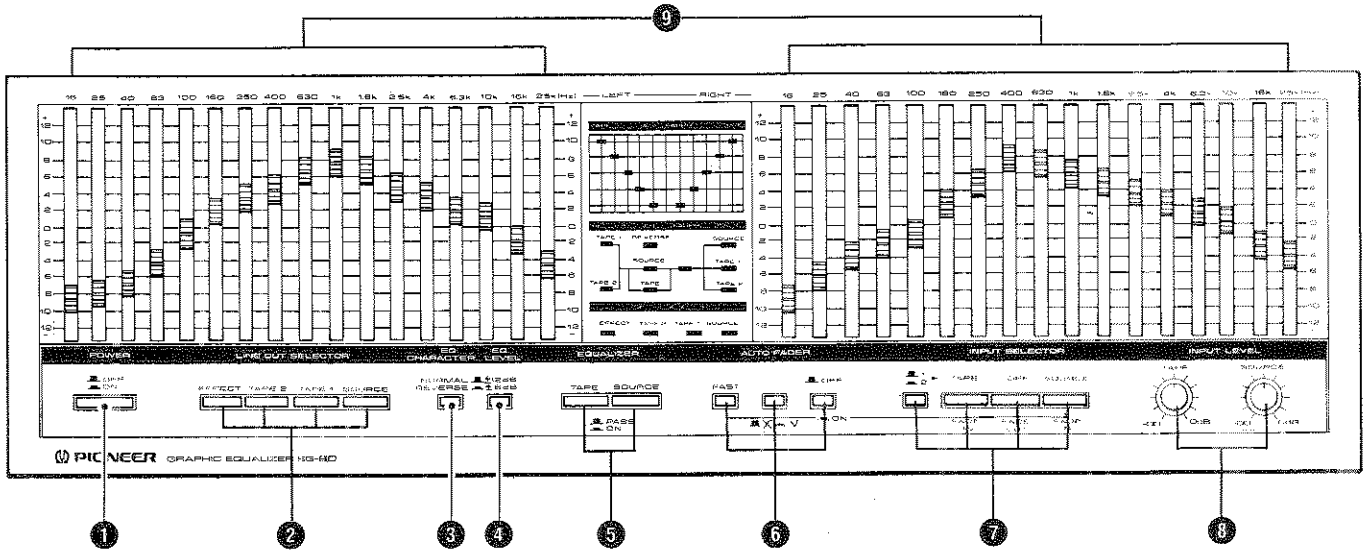
BASIC CONNECTIONS



CONNECTION WITH A DOUBLE DECK



FRONT PANEL FACILITIES



❶ POWER SWITCH (POWER)

When this switch is pressed to the ON position, power is supplied to the unit's main circuits. To turn the power off, press once again.

❷ LINE OUT SELECTOR (LINE OUT SELECTOR)

These selectors are monitor switches which allow you to listen either to the sounds created by the equalizer, or to the original signal without equalizer coloration. When switches SOURCE ~ TAPE 2 are pressed, the signals are output from the unit without regard to the input level control setting or equalizer coloration.

EFFECT: This switch is pressed when you wish to listen to sounds with added equalizer effects. The signals output from the recording terminals (TAPE 1 REC, TAPE 2 REC) on the rear panel will be the same as the sounds heard from the speakers. The signals output from the recording terminals will not be changed even if the TPAE 1, TAPE 2, or SOURCE switches (explained below) are pressed.

TAPE 2: Press this switch when you wish to listen to programs played back from the tape deck connected to the TAPE 2 terminals without sounds being affected by the equalizer unit controls.

TAPE 1: Press this switch when you wish to listen to programs played back from the tape deck connected to the TAPE 1 terminals without sounds being affected by the equalizer unit controls.

SOURCE: Press this switch when you wish to listen to program sources (FM broadcasts, record player, etc.) which are connected to the equalizer unit's INPUT terminals, without sounds being affected by the equalizer unit controls. Also, if two or all three of these switches are pressed together, the switch farthest right will be given priority.

NOTE:
Even if the equalizer or the auto fader is not used, turn the power switch on for playback.

❸ EQUALIZER CHARACTER SELECTOR (EQ CHARACTER)

This switch is pressed when you wish to invert all bands of the frequency compensation curve set with the graphic equalizer controls.

NORMAL: For normal compensation, the switch is pressed to the NORMAL position. The graphic equalizer controls are moved, and the frequency compensation curve of the pattern set with the controls is effected normally.

REVERSE: When you wish to invert all bands of the frequency compensation curve set during normal compensation, press the switch to the REVERSE position.

❹ EQUALIZER LEVEL SELECTOR (■ ± 12 dB/ ▬ ± 6 dB)

This selector is used to choose the ratio of frequency boosting/attenuation.

± 12 dB: During normal compensation, the switch should be pressed to the ± 12 dB position.

± 6 dB: When you wish to proportion the compensation curve in finer gradations, press the selector switch to the ± 6 dB position. In this position, the overall volume of boosting/attenuation will be cut in half, allowing you to set the GRAPHIC EQUALIZER CONTROLS to more delicate effects.

❺ EQUALIZER SELECTOR (EQUALIZER)

This selector allows you to choose the mode (TAPE, SOURCE) affected by the equalizer.

TAPE: Press this switch to the ON position when you wish to add equalizer effects to tape playback sounds.

SOURCE: Press this switch to the ON position when you wish to add equalizer effects to program source (FM broadcasts, record player, etc.) sounds.

When you do not wish to add equalizer effects, release the TAPE or SOURCE switches respectively to the PASS position.

⑥ AUTO FADER CONTROL

Beginning with the switch on the right, these three switches are as follow:

AUTO FADER SWITCH (■ OFF/ ▬ ON)

Press this switch to the ON position when operating the auto fader.

CROSS POINT SWITCH

This switch is used when operating auto fader when you wish to overlap source sounds with tape sounds.

▬ V : When pressed to this position, the source and tape sounds will not be overlapped. At the instant the sound fading out (source or tape) is completely extinguished, the other sound (source or tape) will immediately begin fading in.

■ X : When released to this position, the source and tape sounds will overlap as they fade out and in.

FAST: When this switch is pressed during auto fader, the fade out or fade in time will be shortened during the time the switch is pressed. Continue to press this switch until quick fade in or fade out is completed.

⑦ INPUT SELECTOR

Beginning on the right, these switches are as follows:

When AUTO FADER switch is OFF:

SOURCE: This switch is pressed to input source sounds (FM broadcasts, records player, etc.) without using the auto fader.

OFF: This switch is pressed to cut out the input of source or tape playback sounds without using the auto fader.

TAPE: This switch is pressed to input tape playback sounds without using the auto fader.

■ 1/ ▬ 2 SWITCH

Press this switch to select tape deck 1 or 2 connected to the unit's rear panel. Use this when performing tape playback.

When AUTO FADER switch is ON:

SOURCE/FADE IN: When this switch is pressed, source sounds (FM broadcasts, record player, etc.) will be input (fading in).

OFF/FADE OUT: When this switch is pressed, source or tape playback sounds will be cut (fading out).

TAPE/FADE IN: When this switch is pressed, tape playback sounds will be input (fading in).

When the TAPE and SOURCE switches are pressed together, mixing operation can be performed. When performing mixing, the mixing level is controlled by the INPUT LEVEL controls.

NOTE:
When auto fader is OFF, mixing is not possible.

⑧ INPUT LEVEL CONTROLS (INPUT LEVEL)

These are controls for adjusting the level of source or tape input.

TAPE: Use this control for adjusting the input level coming from tape decks 1 and 2 connected to the unit's rear panel.

SOURCE: Use this control for adjusting the input level of program sources (FM broadcasts, record player, etc.)

⑨ GRAPHIC EQUALIZER CONTROLS (GRAPHIC EQUALIZER)

Operating these controls that divide the entire frequency spectrum into 17 sections can induce changes in the sound quality of the signals in the selected mode (TAPE or SOURCE).

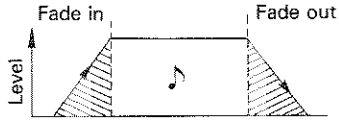
NOTE:
In order to protect the speakers from damage resulting from power overload, do not excessively increase the stereo amplifier's volume level when boosting the treble range on this unit.

FADER CONTROL SECTION

This section features fade in and fade out functions which superimpose the sound of the source (example: end of a song or piece of music) and the tape playback sound (example: start of a song or piece of music) onto each other. One effective use of these functions, for instance, is when recording a medley of your favorite singer's hits.

Fade-in: The sound volume is gradually increased.

Fade-out: The sound volume is gradually reduced.



REGARDING SOURCE FADE IN

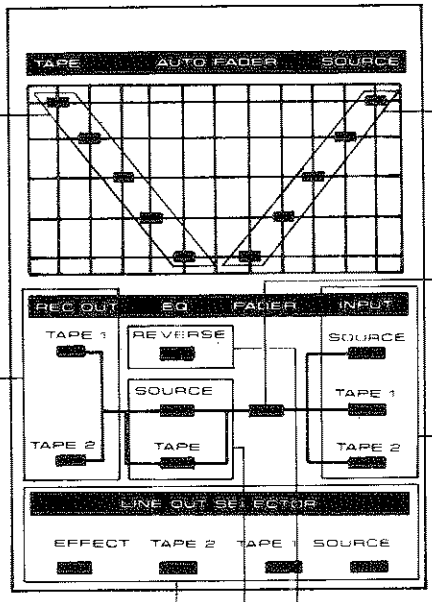
Besides using this switch for normal source (FM broadcasts, record player, etc.) fade in, it can also be pressed during a tape playback in order to fade in a source program while fading out the tape playback sounds. When used with the crosspoint switch, the end of one program (for example, tape playback) can be overlapped with the beginning of another program (for example, source program).

REGARDING TAPE FADE IN

Besides using this switch for tape playback fade in, this switch can be pressed during a source program to fade in tape playback while fading out the source program.

For details, refer to page 12, 13.

INDICATOR SECTION



TAPE FADER INDICATOR

Indicates the process of fade in and fade out of tape playback by the fluctuations of the lights.

RECORDING OUT INDICATOR

Indicator which determines from which recording terminal (1 or 2) on the rear panel signals are being output. Lights in accordance with the position of the Input Selector (1 ■, 2 ▬). For example, when TAPE 1 is chosen with the Input Selector, REC OUT becomes TAPE 2.

SOURCE FADER INDICATOR

Indicates the process of fade in and fade out of source (FM broadcast, records, etc.) by the fluctuations of the lights.

FADE INDICATOR

Lights or is extinguished in accordance with the ON/OFF position of the Auto Fader Switch.

INPUT INDICATOR

Lights in accordance with the selection made on the Input Selector.

EQUALIZER REVERSE INDICATOR

Lights when Equalizer Characteristics Selector is set to Reverse.

LINE OUT INDICATOR

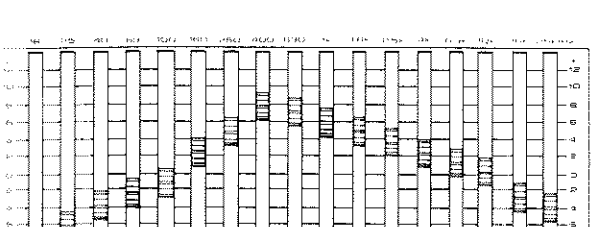
Lights in accordance with the selection made on the Line Out Selector.

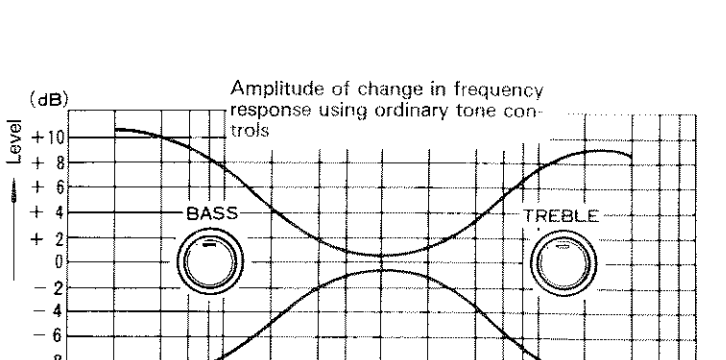
EQUALIZER EFFECTS INDICATOR

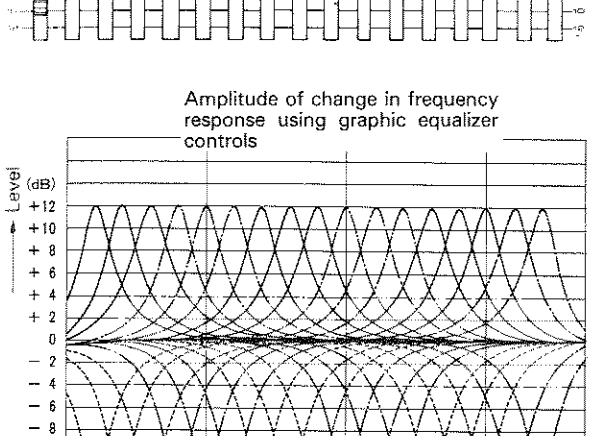
Lights in accordance with the ON/PASS position of the Equalizer Selector.

OPERATING THE GRAPHIC EQUALIZER

The graphic equalizer divides the music source into a number of frequency bands and boosts or attenuates the level at each of the frequencies, enabling much finer sound quality adjustments than ordinary tone controls and sound field compensation.
Some examples of operation are given below.

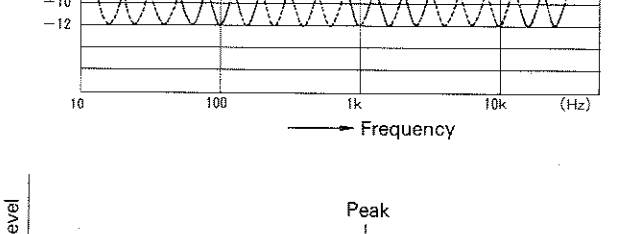






1 COMPENSATING FOR THE PLAYBACK FREQUENCY RESPONSE

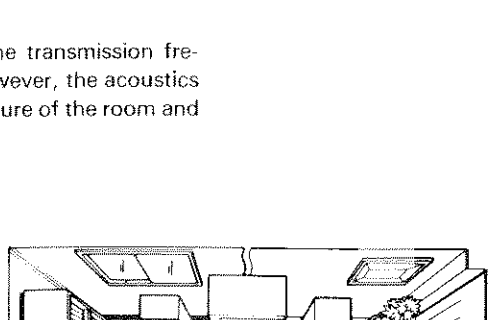
The frequency response of a phono-cartridge or speaker has peaks and dips in the high range and low range. It can be made flat by adjusting finely the controls on the graphic equalizer.



2 IMPROVING THE ACOUSTICS OF THE LISTENING ROOM

The ideal listening room is one where the transmission frequency response is flat. In actual fact, however, the acoustics vary depending on the effects of the structure of the room and its furniture and on the listening position.

In a room surrounded by hard walls and windows and having a bare floor, the bass sounds are reflected to a great extent and sounds dull. Lower the controls for 100 Hz ~ 250 Hz and modify the bass range.
The acoustics undergo change in accordance with the furniture in the listening room, the height of the ceiling and the listening position, among other factors. Play the music and try operating each of the controls to produce the best effect.



In a room surrounded by drapes and with carpets on the floor, there is minimal reflection of the sound and the treble is absorbed. At times like this, raise the controls for 2.5 kHz, 4 kHz, and 6.3 kHz and modify the treble range.

3 COLORING THE REPRODUCED SOUND

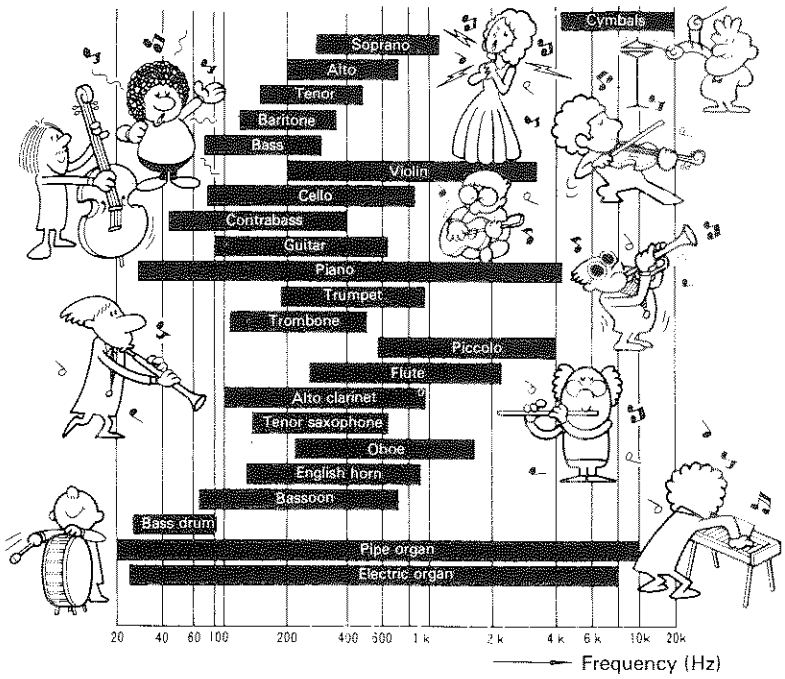
All instruments and vocals have their own frequency band, as shown in the figure.

By moving the controls up or down, the volume of the instruments preferred can be boosted or other instruments can be attenuated.

For instance, it is possible to boost the 40 ~ 63 Hz frequency and give the bass drum a greater "punch", or boost the 400 Hz ~ 1 kHz frequency and position the vocals at the front. When the 6.3 ~ 10 kHz frequency is boosted, the cymbals and "high hat" sound much clearer.

Instruments and vocals have a great many harmonic components along with the fundamental frequency band so you can have lots of fun operating the 17 controls to achieve the sound of your choice.

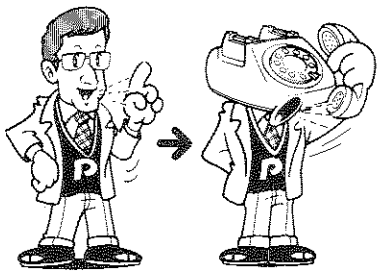
NOTE:
In order to protect the speakers from damage resulting from power overload, do not excessively increase the stereo amplifier's volume level when boosting the treble range on this unit.



4 RECORDING TECHNIQUES USING GRAPHIC EQUALIZER

Coloring the sound of vocals or instruments

The sound of vocals and instruments can be colored at will by operating the controls. For instance, when the 400 Hz ~ 2.5 kHz controls are raised and the other controls lowered, people's voices sound as if heard on a telephone.

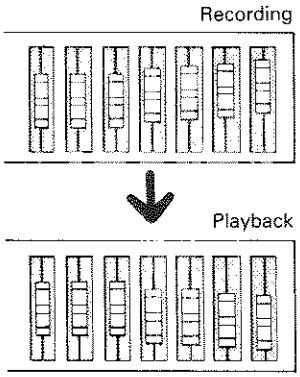


Preventing howl during mixing play

Any irritating howl during play can be prevented by lowering the knob corresponding to the frequency band in which the howl occurs.

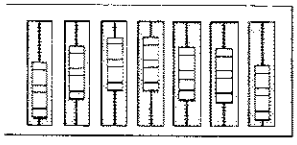
Noise can be reduced during recording and playback

When the high-range controls are boosted in step fashion during recording and then lowered in reverse fashion during playback, tape hiss and other high-range noise can be reduced. This unit is equipped with the Equalizer Characteristics Selector, therefore operation becomes simple when set to Reverse from Normal.



Creating recorded tapes most compatible with the playback equipment

A sound with a greater "punch" can be recorded for playback on car stereo equipment if the ultra-low-range, which is hard to hear, is cut out and the mid-range is boosted.



MIXING

In general, mixing is the process of mixing one sound (signal) with another, in order to produce a new sound.
For instance, adjusting the volume between a microphone and a record or tape playback is mixing. Singing along to background recording is another typical example of mic mixing.

REGARDING MIXING FUNCTION

Besides this unit's main function of graphic equalization, mixing capability is provided. One example of this function is the mixing of program source (AM/FM broadcasts, record player, or compact discs) sounds with tape playback sounds. When combined with a microphone mixing amplifier, microphone mixing can also be performed.

PREPARATIONS

PREPARATION OF PROGRAM SOURCE

Prepare the record player, FM broadcast, or compact disc for immediate operation.

PREPARATION OF TAPE DECK

Insert a recorded cassette tape into tape deck 1 and set the deck to the playback stand-by mode.
Insert an empty cassette tape into tape deck 2 and set the deck to the recording stand-by mode.

PREPARATION OF STEREO AMPLIFIER

Set the stereo amplifier's function switch in accordance with the program source to be used.
Turn the stereo amplifier's tape monitor switch ON, or select TAPE 1 or TAPE 2, in accordance with the Stereo Amplifiers terminals connected at the unit. Set volume level appropriately.

OPERATION SEQUENCE

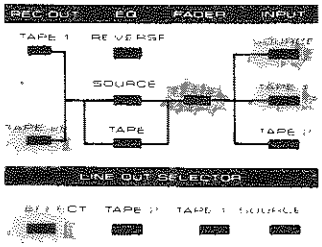
1. Press the EFFECT switch of the LINE OUT SELECTOR.
2. Press the AUTO FADER switch to the ON position.
   Press the SOURCE and TAPE switches together on the unit's INPUT SELECTOR.
3. Set the tape deck 1 for playback and the record player to the playing mode.
4. Adjust the SOURCE and TAPE INPUT LEVEL controls, and decide on the desired mixing level proportion.
5. Set the SOURCE side and TAPE side components to the stand-by mode at the beginning of the desired programs.
6. When using the equalizer effects, press the TAPE and SOURCE switches of the EQUALIZER SELECTOR to the ON position.
7. Set tape deck 2 to the recording mode.

When using a double deck, record with the recording/playback deck (B).

Adjusting the proportion and timing of sounds is difficult during mixing. Try several times until you achieve the effect you like. Also, when used together with the auto fader control, you can achieve a skillful effect of joining program to program. For details, refer to page 12.

About the indicator section when performing mixing recording:

When performing mixing of the program source and tape deck 1 sides, and recording the results on the tape deck 2.

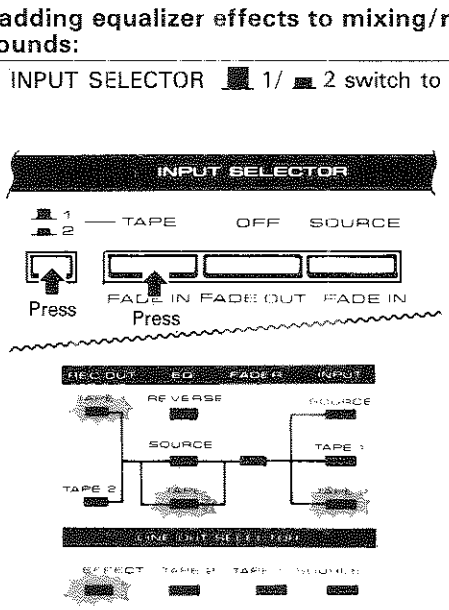


When playing back mixing/recorded sounds:

Press the TAPE 2 switch of the LINE OUT SELECTOR.

When adding equalizer effects to mixing/recording sounds:

Press the INPUT SELECTOR 1/2 switch to the "2" position.



REGARDING THE AUTO FADER CONTROLS

FADE IN AND FADE OUT

Fade in is the gradual introduction of an input sound, from an inperceptible level up to its normal sound volume. Fade out is the reverse, the gradual reduction of a playback sound from its normal level to an inperceptible level.

REGARDING AUTO FADER

When the auto fader control function is used, you can gradually fade out the end of one program while fading in the beginning of the next program (See Fig. 1).
In addition, with the cross point switch, you can cause the fade out and fade in programs to overlap. For example, you can begin fade out just before the end of the last bar of one song, while beginning to fade in the second song (See Fig. 2).

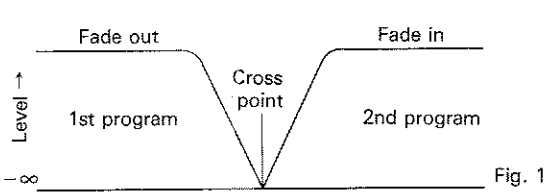


Fig. 1

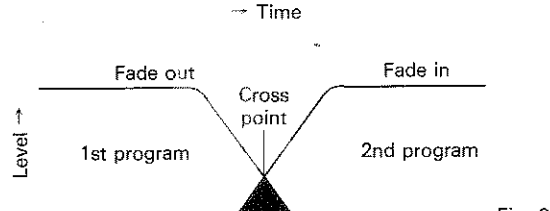
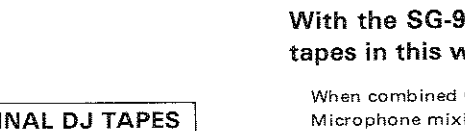


Fig. 2

With the SG-90, you can create your own original tapes in this way.

ORIGINAL DJ TAPES



Add your own D.J. commentary between the music on records or tapes, creating your own original "Top Ten" programs.

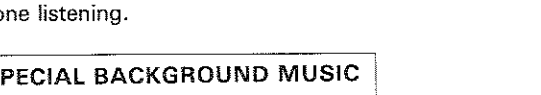
SOUND LOVE LETTER TAPES

Create your own intimate "love letter" tapes. You can include your own personal message with the favorite music of that special person as background.

DISCO TAPES

Create seamless music tapes with no breaks between songs--perfect for disco parties! The unit can also be used of course for creating tapes perfectly balanced for car stereo or headphone listening.

SPECIAL BACKGROUND MUSIC



Create your own characteristic background music by including sound effects crossing between programs.

BEFORE OPERATION

Set up the components before operation as follows.

Stereo amplifier

- Set the power switch to ON.
- Set the volume control to the "3" or "4" position.
- Set the ADAPTOR/TAPE 2 switch (or tape monitor switch) to ON. For stereo amplifiers with 2 types of tape terminals, select TAPE 1 or TAPE 2, in accordance with the tape decks connected to the unit's tape terminals.

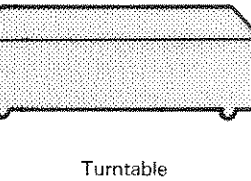
Tuner

- Set the power switch to ON.
- Tune in the desired broadcast station.

Cassette tape deck

- Set the power switch to ON.
- Ready the pre-recorded cassette tape and load it into the playback deck.

Turntable



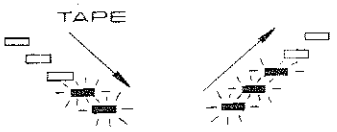
- Set the power switch to ON.
- Ready the record and place it on the platter.
- Set the turntable so that the desired track can be started at any time (manual play).

Preparations

The following is an explanation of basic fader control operations.

Example: When you wish to add fader controls to the first program on the tape side, and the second program on the source side (a record).

1. Press the Auto Fader switch to OFF.
2. Set the INPUT LEVEL controls of TAPE and SOURCE to the 0 dB position.
3. Press the EFFECT switch of the LINE OUT SELECTOR.
4. Press the TAPE and SOURCE switches of the INPUT SELECTOR alternately.
   Adjust the volume level of both programs using the INPUT LEVEL control.
5. Press the TAPE switch of the INPUT SELECTOR.
6. Use the CROSSPOINT switch to select the degree of overlapping you desire.
7. Press the AUTO FADER ON/OFF switch to the ON position.
8. In accordance with the desired timing of the program change, press the SOURCE/FADE IN switch. If you wish the fade in to occur rapidly, press the FAST switch while pressing the FADE IN switch.
   If the FAST Switch is pressed, the CROSSPOINT switch will not function.



TAPE ..... Fade out.
SOURCE ..... Fade in.

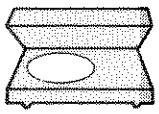
The first program on the tape side will gradually fade out, and the second program on the source side will fade in accordingly with the crosspoint.

Points to remember when operating the auto fader:

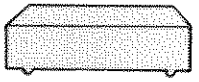
Set your tape deck in the playback stand-by mode at the beginning of your desired program. With a turntable, use the arm lifter controls to raise the tonearm over the beginning point of your desired program.

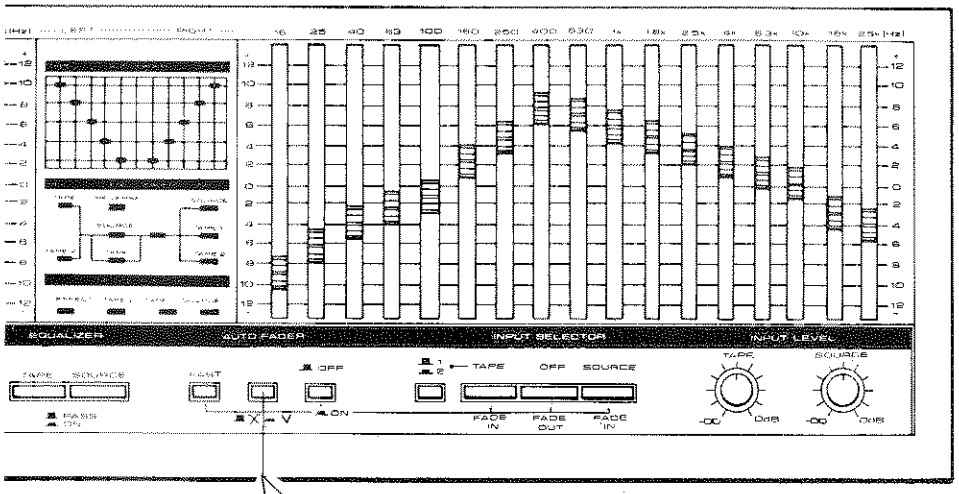
If a tape deck is connected to the TAPE 2 terminals of this unit, recording can be performed merely by setting to the recording mode. Refer to page 22 for applications.

Turntable



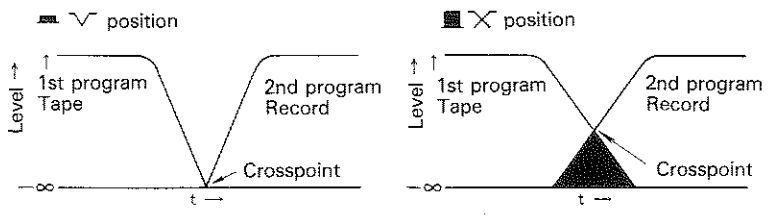
Cassette tape deck





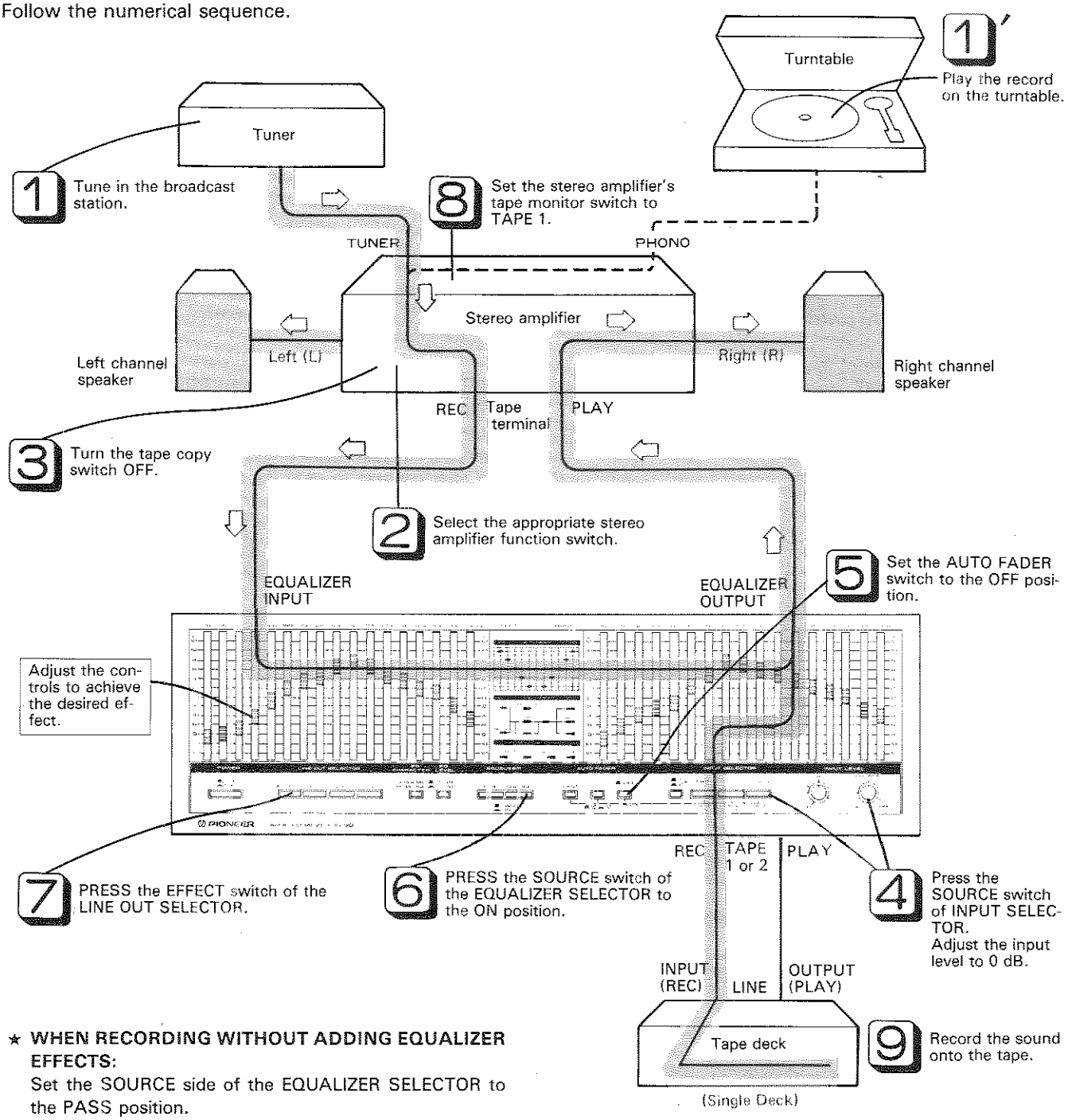
CROSS POINT SWITCH

Depending on the position of this switch, the degree of overlap varies.



TAPE RECORDING A RECORD PROGRAM OR RADIO BROADCAST WITH EQUALIZER COMPENSATION ADDED

Follow the numerical sequence.



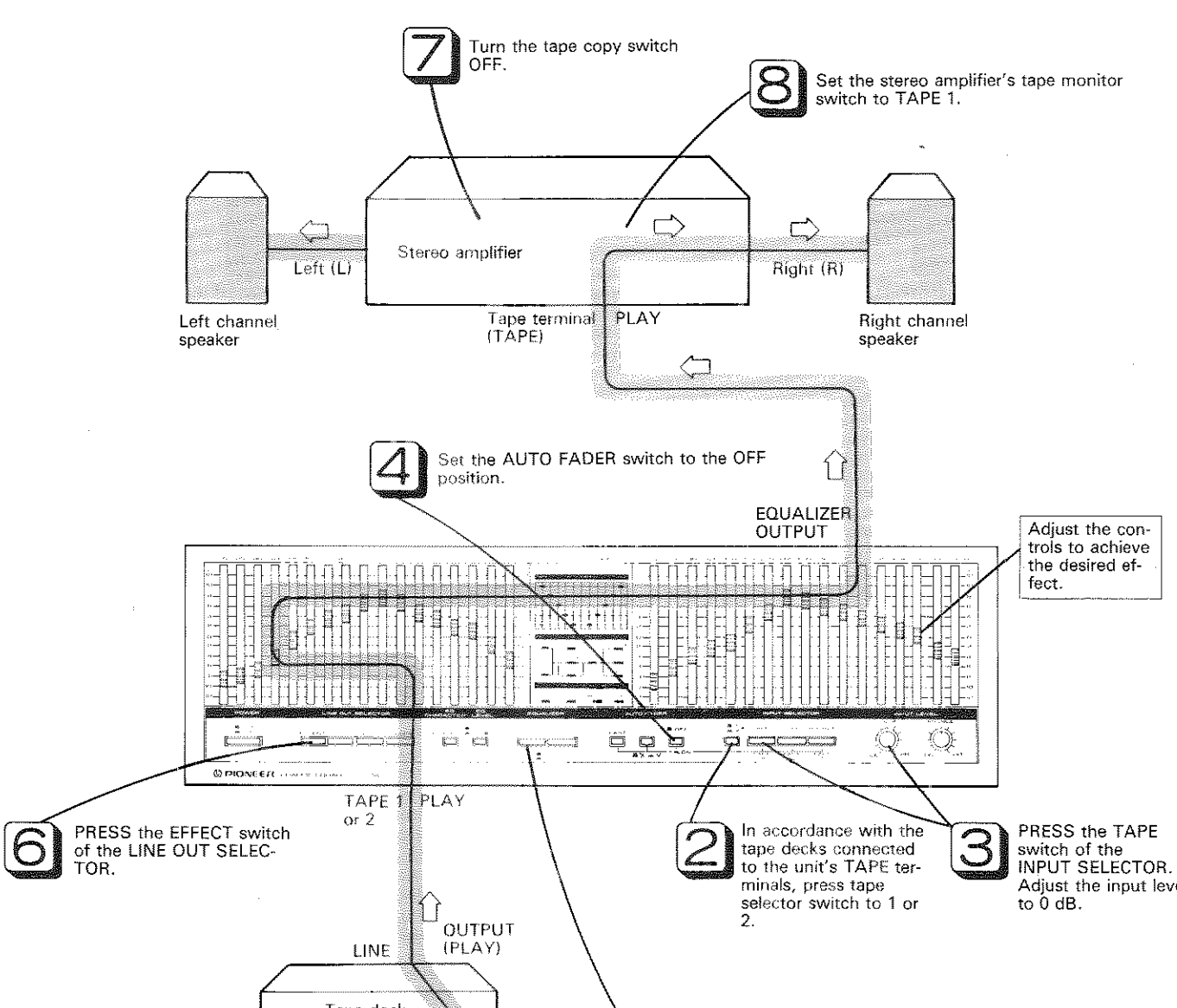
★ **WHEN RECORDING WITHOUT ADDING EQUALIZER EFFECTS:**
Set the SOURCE side of the EQUALIZER SELECTOR to the PASS position.

★ **WHEN MONITORING THE PROGRAM SOURCE:**
When listening directly to the program source (record program, radio broadcast, etc.), press the SOURCE switch of the LINE OUT SELECTOR.

★ **WHEN MONITORING THE RECORDING:**
When listening to the monitor output of the deck in recording, press TAPE 1 (or TAPE 2) of the LINE OUT SELECTOR.

COMPENSATING TAPE PLAYBACK WITH EQUALIZER EFFECTS

Follow the numerical sequence.


7 Turn the tape copy switch OFF.
8 Set the stereo amplifier's tape monitor switch to TAPE 1.
Stereo amplifier
Left (L)
Right (R)
Left channel speaker
Right channel speaker
Tape terminal (TAPE)
PLAY
4 Set the AUTO FADER switch to the OFF position.
EQUALIZER OUTPUT
Adjust the controls to achieve the desired effect.
TAPE 1 or 2
PLAY
6 PRESS the EFFECT switch of the LINE OUT SELECTOR.
2 In accordance with the tape decks connected to the unit's TAPE terminals, press tape selector switch to 1 or 2.
3 PRESS the TAPE switch of the INPUT SELECTOR. Adjust the input level to 0 dB.
LINE
OUTPUT (PLAY)
Tape deck
(Single or Double Deck)
1 Play back the tape.
5 PRESS the TAPE switch of the EQUALIZER SELECTOR to the ON position.

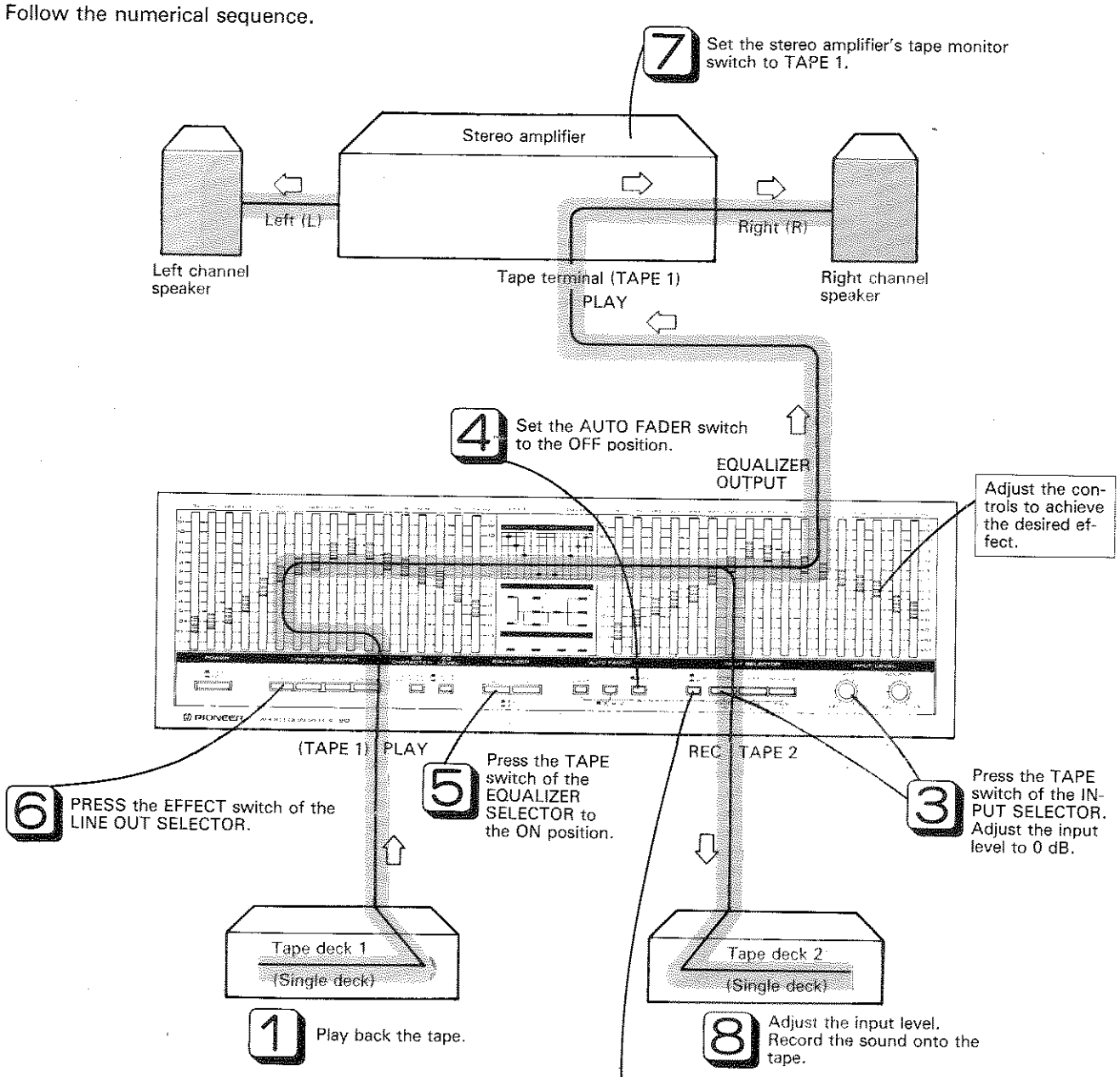
★ **WHEN PERFORMING PLAYBACK WITHOUT ADDING EQUALIZER EFFECTS:**
Press the TAPE side of the EQUALIZER SELECTOR to the PASS position.

★ **WHEN LISTENING DIRECTLY TO TAPE SOUNDS:**
Press the TAPE (1 or 2) switch of the LINE OUT SELECTOR.

PERFORMING TAPE EDITING WITH EQUALIZER EFFECTS I (Copying from tape deck 1 to deck 2)

■ When the unit is connected to the stereo amplifier's TAPE 1 terminals, and 2 tape decks (single decks) are connected to the unit.

Follow the numerical sequence.


7 Set the stereo amplifier's tape monitor switch to TAPE 1.
Stereo amplifier
Left (L)
Right (R)
Left channel speaker
Tape terminal (TAPE 1)
PLAY
Right channel speaker
4 Set the AUTO FADER switch to the OFF position.
EQUALIZER OUTPUT
Adjust the controls to achieve the desired effect.
(TAPE 1) PLAY
REC TAPE 2
6 PRESS the EFFECT switch of the LINE OUT SELECTOR.
5 Press the TAPE switch of the EQUALIZER SELECTOR to the ON position.
3 Press the TAPE switch of the INPUT SELECTOR. Adjust the input level to 0 dB.
Tape deck 1
(Single deck)
Tape deck 2
(Single deck)
1 Play back the tape.
8 Adjust the input level. Record the sound onto the tape.
2 Set the tape selector switch to 1 or 2 in accordance with the tape deck used for the playback side

★ **WHEN PERFORMING TAPE COPYING WITHOUT ADDING EQUALIZER EFFECTS:**
Set the TAPE side switch of the EQUALIZER SELECTOR to the PASS position.

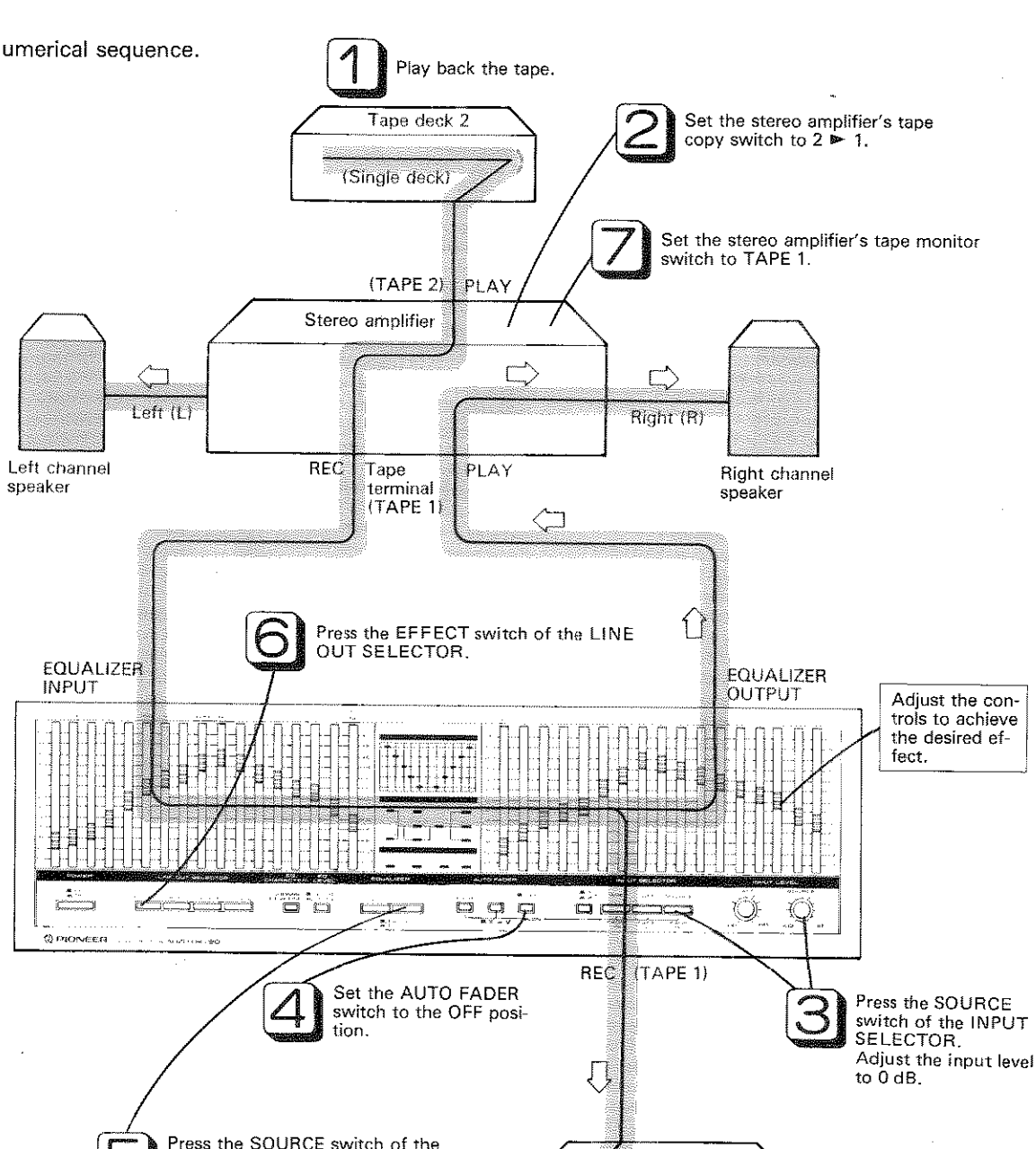
★ **WHEN LISTENING DIRECTLY TO TAPE SOUNDS (TAPE 1):**
Press the TAPE 1 switch of the LINE OUT SELECTOR. However, sounds with the added equalizer effects will be recorded onto tape deck 2.

★ **WHEN MONITORING THE RECORDING (TAPE 2):**
Press the TAPE 2 switch of the LINE OUT SELECTOR. The sounds of the monitor output of tape deck 2 will be heard.

PERFORMING TAPE EDITING WITH EQUALIZER EFFECTS II (Copying from tape deck 2 to deck 1)

■ When the unit is connected to the stereo amplifier's TAPE 1 terminals, and the playback tape deck is connected to the Stereo Amplifier's TAPE 2 terminals.

Follow the numerical sequence.


1 Play back the tape.
Tape deck 2
(Single deck)
2 Set the stereo amplifier's tape copy switch to 2 ► 1.
7 Set the stereo amplifier's tape monitor switch to TAPE 1.
(TAPE 2) PLAY
Stereo amplifier
Left (L)
Right (R)
Left channel speaker
REC
Tape terminal (TAPE 1)
PLAY
Right channel speaker
6 Press the EFFECT switch of the LINE OUT SELECTOR.
EQUALIZER INPUT
EQUALIZER OUTPUT
Adjust the controls to achieve the desired effect.
REC (TAPE 1)
4 Set the AUTO FADER switch to the OFF position.
3 Press the SOURCE switch of the INPUT SELECTOR. Adjust the input level to 0 dB.
5 Press the SOURCE switch of the EQUALIZER SELECTOR to the ON position.
Tape deck 1
(Single deck)
8 Adjust the input level. Record the sound onto the tape.

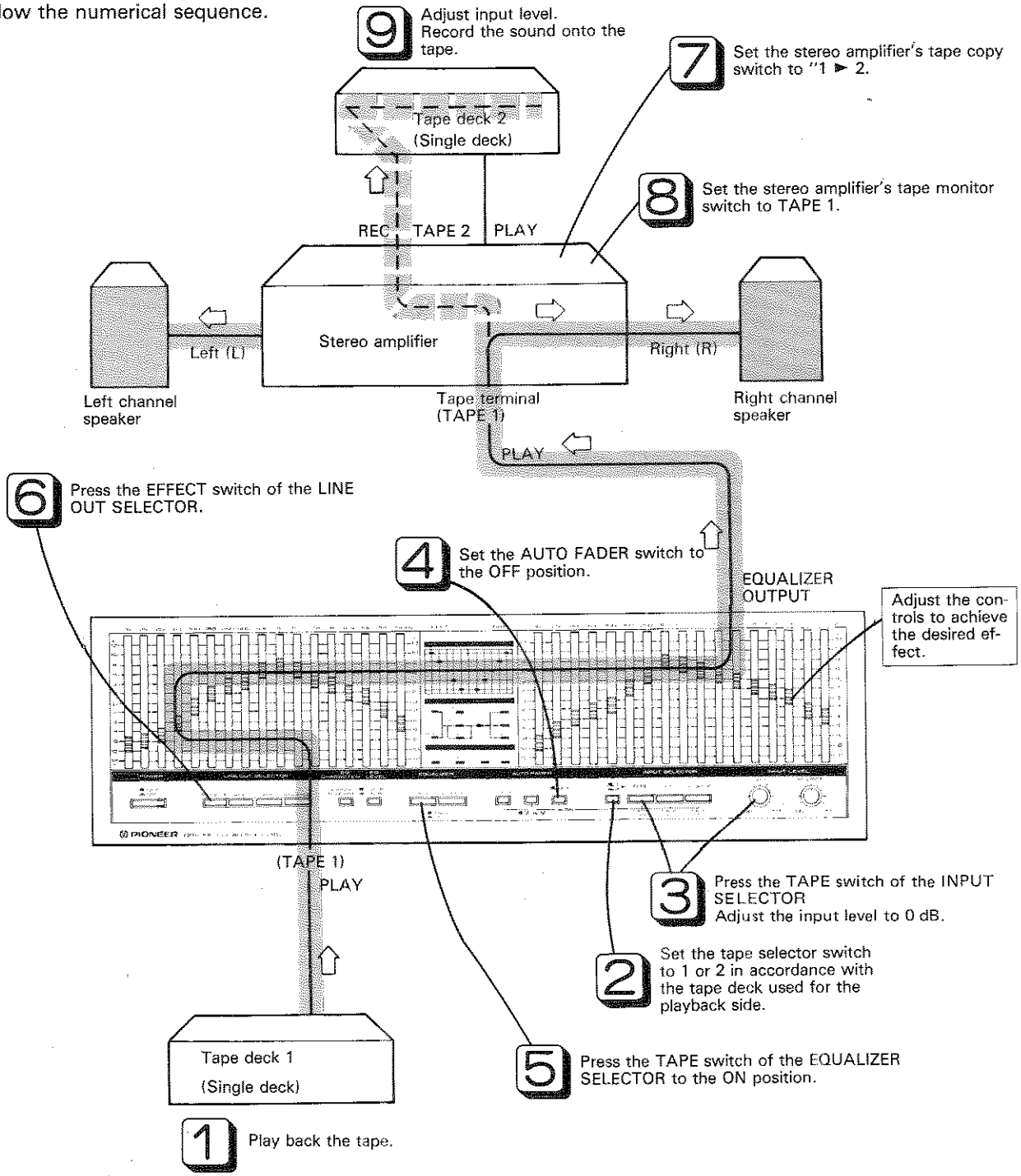
★ **WHEN PERFORMING TAPE COPYING WITHOUT ADDING EQUALIZER EFFECTS:**
Set the SOURCE side switch of the EQUALIZER SELECTOR to the PASS position.

★ **WHEN PLAYING BACK THE MATERIAL RECORDED ON TAPE DECK 1:**
Press the TAPE 1 switch of the LINE OUT SELECTOR.

PERFORMING TAPE EDITING WITH EQUALIZER EFFECTS III (Copying from tape deck 1 to deck 2)

■ When the unit is connected to the stereo amplifier's TAPE 1 terminals, and the playback tape deck is connected to the unit's TAPE 1 terminals.

Follow the numerical sequence.


9 Adjust input level. Record the sound onto the tape.
7 Set the stereo amplifier's tape copy switch to "1 ► 2.
Tape deck 2 (Single deck)
8 Set the stereo amplifier's tape monitor switch to TAPE 1.
REC
TAPE 2
PLAY
Left (L)
Stereo amplifier
Right (R)
Left channel speaker
Tape terminal (TAPE 1)
Right channel speaker
PLAY
6 Press the EFFECT switch of the LINE OUT SELECTOR.
4 Set the AUTO FADER switch to the OFF position.
EQUALIZER OUTPUT
Adjust the controls to achieve the desired effect.
(TAPE 1)
PLAY
3 Press the TAPE switch of the INPUT SELECTOR
Adjust the input level to 0 dB.
2 Set the tape selector switch to 1 or 2 in accordance with the tape deck used for the playback side.
Tape deck 1 (Single deck)
5 Press the TAPE switch of the EQUALIZER SELECTOR to the ON position.
1 Play back the tape.

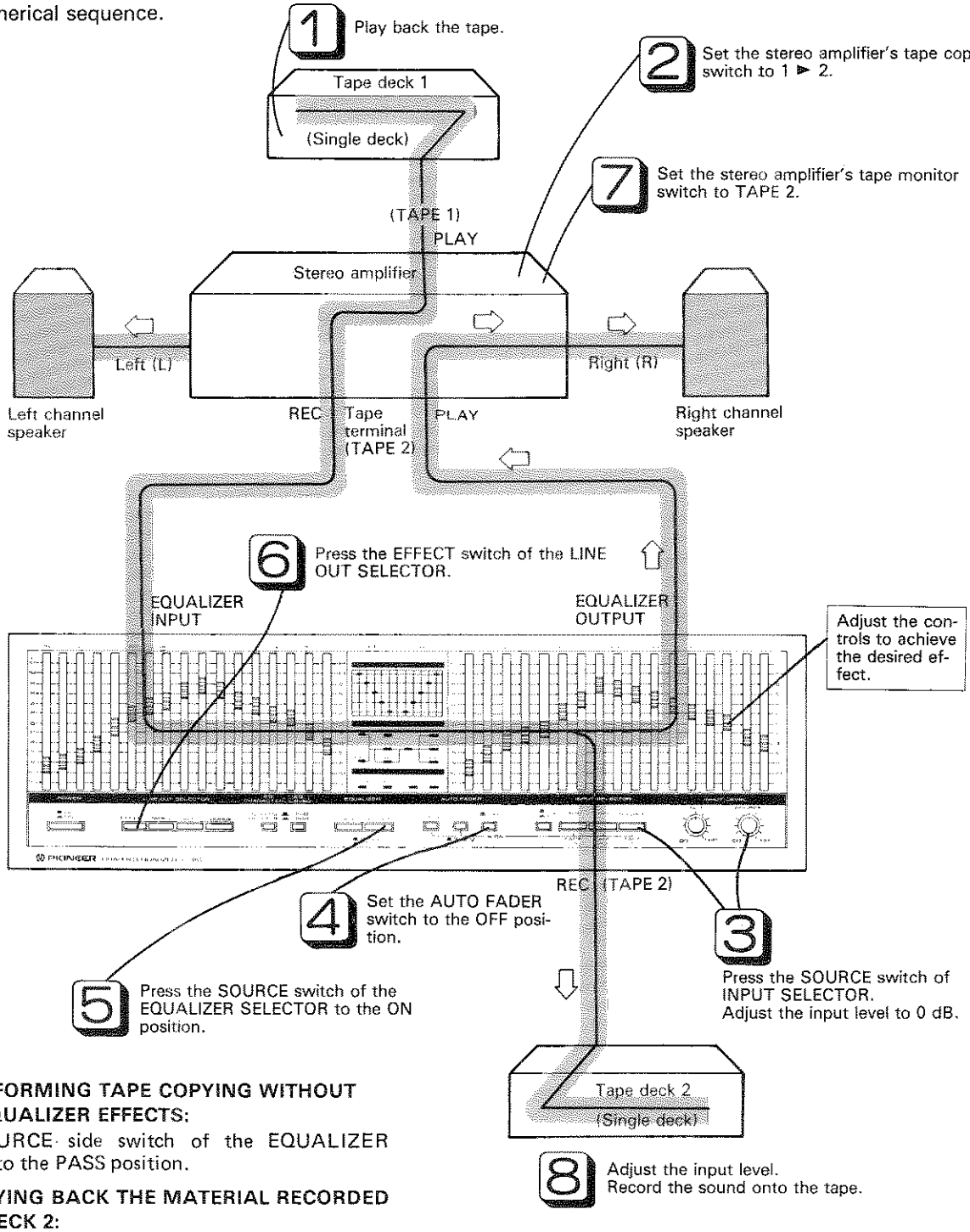
★ **WHEN PERFORMING TAPE COPYING WITHOUT ADDING EQUALIZER EFFECTS:**
Set the TAPE side switch of the EQUALIZER SELECTOR to the PASS position.

★ **WHEN PLAYING BACK THE MATERIAL RECORDED ON TAPE DECK 2:**
Set the stereo amplifier's tape monitor switch to TAPE 2.

PERFORMING TAPE EDITING WITH EQUALIZER EFFECTS IV (Copying from tape deck 1 to deck 2)

■ When the unit is connected to the stereo amplifier's TAPE 2 terminals, and the playback tape deck is connected to the Stereo Amplifier's TAPE 1 terminals.

Follow the numerical sequence.

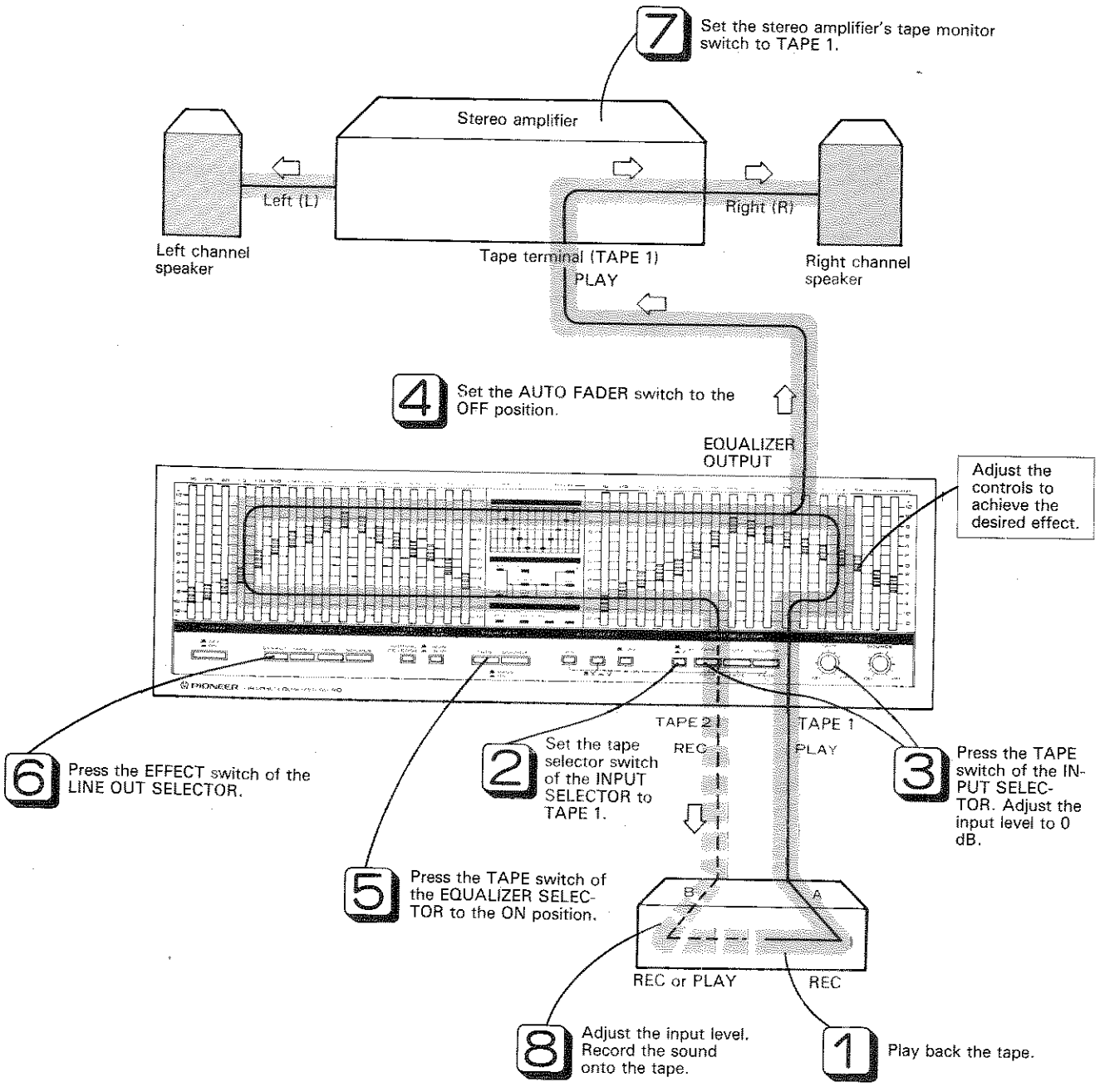

1 Play back the tape.
Tape deck 1
(Single deck)
2 Set the stereo amplifier's tape copy switch to 1 ► 2.
7 Set the stereo amplifier's tape monitor switch to TAPE 2.
(TAPE 1)
PLAY
Stereo amplifier
Left (L)
Right (R)
Left channel speaker
REC
Tape terminal (TAPE 2)
PLAY
Right channel speaker
6 Press the EFFECT switch of the LINE OUT SELECTOR.
EQUALIZER INPUT
EQUALIZER OUTPUT
Adjust the controls to achieve the desired effect.
REC (TAPE 2)
4 Set the AUTO FADER switch to the OFF position.
3 Press the SOURCE switch of INPUT SELECTOR.
Adjust the input level to 0 dB.
5 Press the SOURCE switch of the EQUALIZER SELECTOR to the ON position.
Tape deck 2
(Single deck)
8 Adjust the input level.
Record the sound onto the tape.

★ **WHEN PERFORMING TAPE COPYING WITHOUT ADDING EQUALIZER EFFECTS:**
Set the SOURCE side switch of the EQUALIZER SELECTOR to the PASS position.

★ **WHEN PLAYING BACK THE MATERIAL RECORDED ON TAPE DECK 2:**
Press the TAPE 2 switch of the LINE OUT SELECTOR.

PERFORMING TAPE EDITING WITH EQUALIZER EFFECTS V (When using PIONEER's double deck)

Follow the numerical sequence.


7 Set the stereo amplifier's tape monitor switch to TAPE 1.
Stereo amplifier
Left (L)
Right (R)
Left channel speaker
Tape terminal (TAPE 1)
PLAY
Right channel speaker
4 Set the AUTO FADER switch to the OFF position.
EQUALIZER OUTPUT
Adjust the controls to achieve the desired effect.
TAPE 2
REC
TAPE 1
PLAY
6 Press the EFFECT switch of the LINE OUT SELECTOR.
2 Set the tape selector switch of the INPUT SELECTOR to TAPE 1.
3 Press the TAPE switch of the INPUT SELECTOR. Adjust the input level to 0 dB.
5 Press the TAPE switch of the EQUALIZER SELECTOR to the ON position.
B
A
REC or PLAY
REC
8 Adjust the input level. Record the sound onto the tape.
1 Play back the tape.

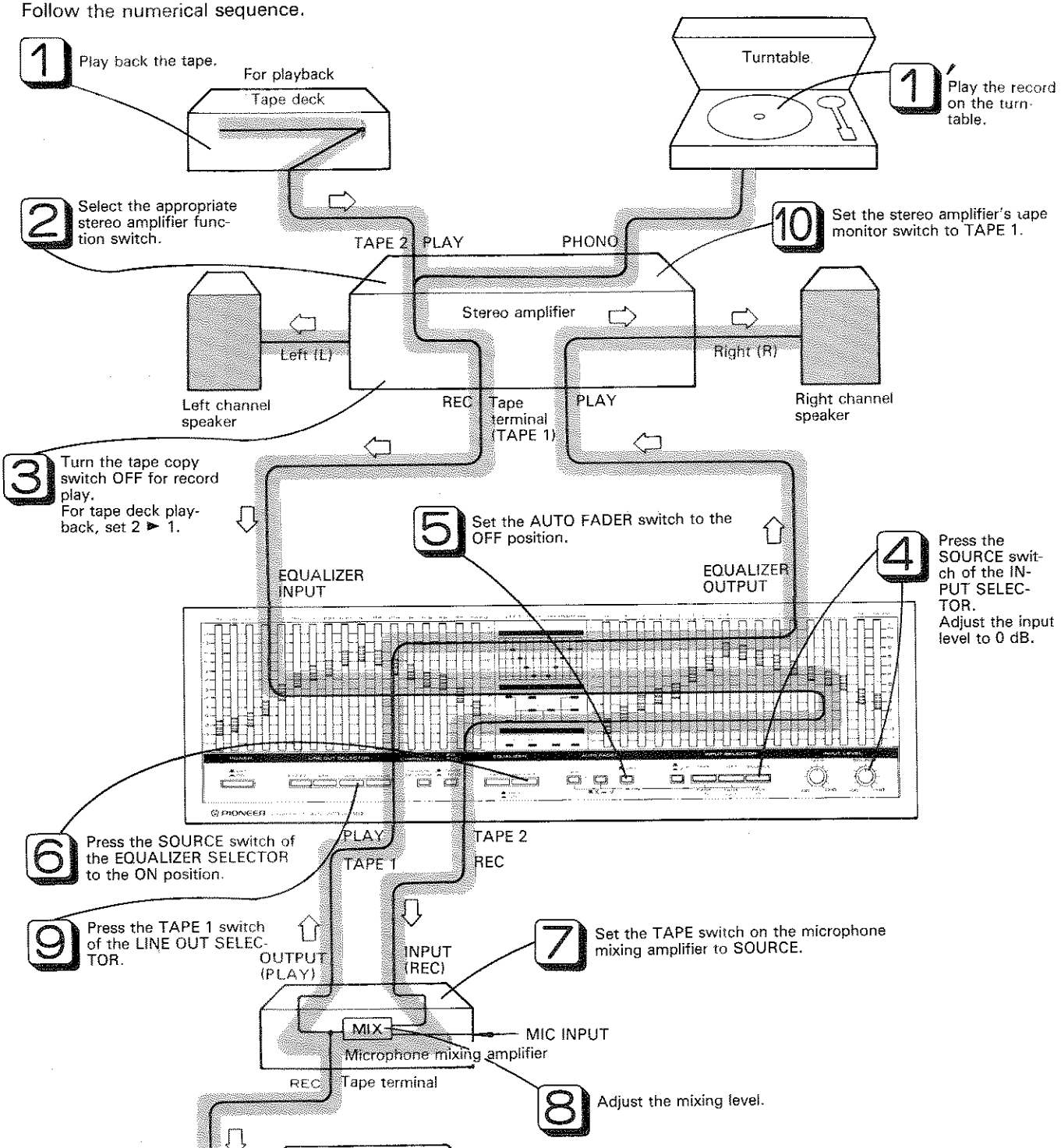
★ **WHEN PERFORMING PLAYBACK WITHOUT ADDING EQUALIZER EFFECTS:**
Press the TAPE side of the EQUALIZER SELECTOR to the PASS position.

★ **WHEN LISTENING DIRECTLY TO TAPE SOUNDS:**
Press the TAPE 1 switch of the LINE OUT SELECTOR. However, sounds with the added equalizer effects will be recorded on the B deck side.

RECORDING WHILE PERFORMING MICROPHONE MIXING WITH ADDED EQUALIZER COMPENSATION

■ When microphone mixing amplifier is connected to the unit's TAPE terminals.

Follow the numerical sequence.


1 Play back the tape.
For playback
Tape deck
Turntable
1′ Play the record on the turntable.
2 Select the appropriate stereo amplifier function switch.
TAPE 2 PLAY
PHONO
10 Set the stereo amplifier's tape monitor switch to TAPE 1.
Stereo amplifier
Left (L)
Right (R)
Left channel speaker
REC
Tape terminal (TAPE 1)
PLAY
Right channel speaker
3 Turn the tape copy switch OFF for record play.
For tape deck playback, set 2 ► 1.
5 Set the AUTO FADER switch to the OFF position.
4 Press the SOURCE switch of the INPUT SELECTOR.
Adjust the input level to 0 dB.
EQUALIZER INPUT
EQUALIZER OUTPUT
6 Press the SOURCE switch of the EQUALIZER SELECTOR to the ON position.
PLAY
TAPE 1
TAPE 2
REC
9 Press the TAPE 1 switch of the LINE OUT SELECTOR.
OUTPUT (PLAY)
INPUT (REC)
7 Set the TAPE switch on the microphone mixing amplifier to SOURCE.
MIX
MIC INPUT
Microphone mixing amplifier
REC
Tape terminal
8 Adjust the mixing level.
For Recording
Tape deck
(single deck)
11 Adjust the input level. Record the sound onto the tape.

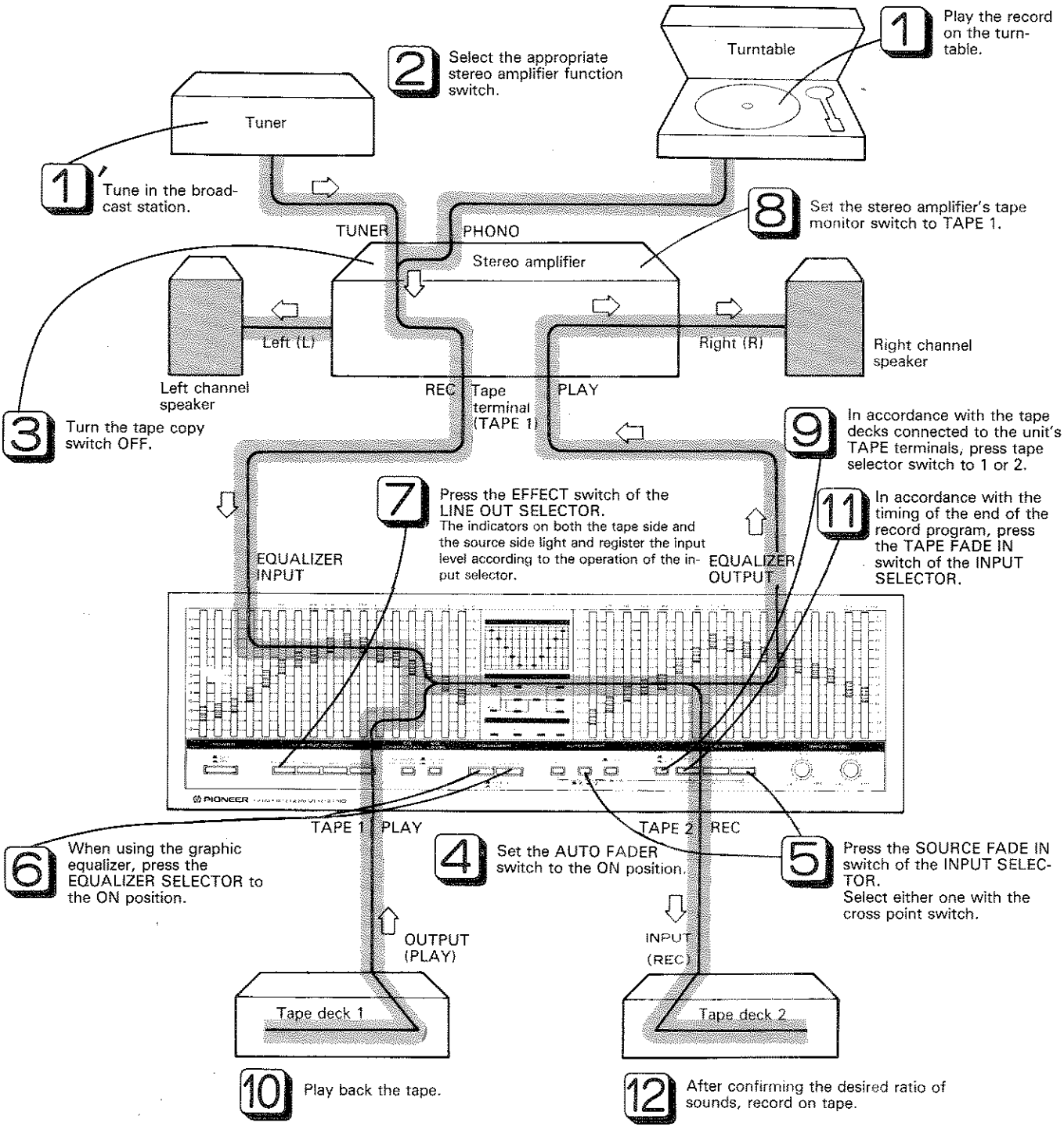
For further details about mixing, refer to the Operating Instructions for the microphone mixing amplifier.

★ **WHEN PERFORMING TAPE COPYING WITHOUT ADDING EQUALIZER EFFECTS:**
Set the SOURCE side switch of the EQUALIZER SELECTOR to the PASS position.

ADDING AUTO FADER OPERATION TO RECORD PROGRAMS AND TAPE PLAYBACK WHILE RECORDING

■ When beginning the record program with fade in, ending it with fade out, and then beginning the tape playback with fade in.

Follow the numerical sequence.


1 Play the record on the turntable.
Turntable
2 Select the appropriate stereo amplifier function switch.
Tuner
1' Tune in the broadcast station.
8 Set the stereo amplifier's tape monitor switch to TAPE 1.
TUNER
PHONO
Stereo amplifier
Left (L)
Right (R)
Left channel speaker
Right channel speaker
REC
Tape terminal (TAPE 1)
PLAY
3 Turn the tape copy switch OFF.
9 In accordance with the tape decks connected to the unit's TAPE terminals, press tape selector switch to 1 or 2.
7 Press the EFFECT switch of the LINE OUT SELECTOR.
The indicators on both the tape side and the source side light and register the input level according to the operation of the input selector.
11 In accordance with the timing of the end of the record program, press the TAPE FADE IN switch of the INPUT SELECTOR.
EQUALIZER INPUT
EQUALIZER OUTPUT
TAPE 1 PLAY
TAPE 2 REC
6 When using the graphic equalizer, press the EQUALIZER SELECTOR to the ON position.
4 Set the AUTO FADER switch to the ON position.
5 Press the SOURCE FADE IN switch of the INPUT SELECTOR.
Select either one with the cross point switch.
OUTPUT (PLAY)
INPUT (REC)
Tape deck 1
Tape deck 2
10 Play back the tape.
12 After confirming the desired ratio of sounds, record on tape.

★ **AUTO FADER SECTION**

For further details regarding the auto fader, refer to page 12.

SPECIFICATIONS

Graphic Equalizer Section

Equalizer Frequency 16, 25, 40, 63, 100, 160, 250, 400, 630 1 k, 1.6 k, 2.5 k, 4 k, 6.3 k, 10 k, 16 k, 25 k
Equalizer level ..... ± 12 dB, ± 6 dB
Total Harmonic Distortion** ..... 0.001% (20 Hz ~ 20 kHz, 1 V, Equalizer Flat)
Input Impedance
INPUT, TAPE 1 PLAY, TAPE 2 PLAY ..... 47 kΩ
Output Inpedance
OUTPUT ..... 200 Ω
TAPE 1 REC, TAPE 2 REC ..... 2.2 kΩ
Frequency Response ..... 10 ~ 100 kHz $^{0}_{-3}$ dB (Equalizer Flat)
Hum and Noise (IHFA Network, short curcuit, 2 V output) ..... 120 dB (Equalizer Flat)
Hum and Noise (DIN) ..... 96 dB (Equalizer Flat)
Gain ..... 0 dB (Equalizer Flat, Input Level 0 dB)

Auto Fader Section

Fade in time ..... 4 sec.
Fade out time ..... 6 sec.

**HARMONIC DISTORTION (BY AUTOMATIC DISTORTION ANALYZER)

MISCELLANEOUS

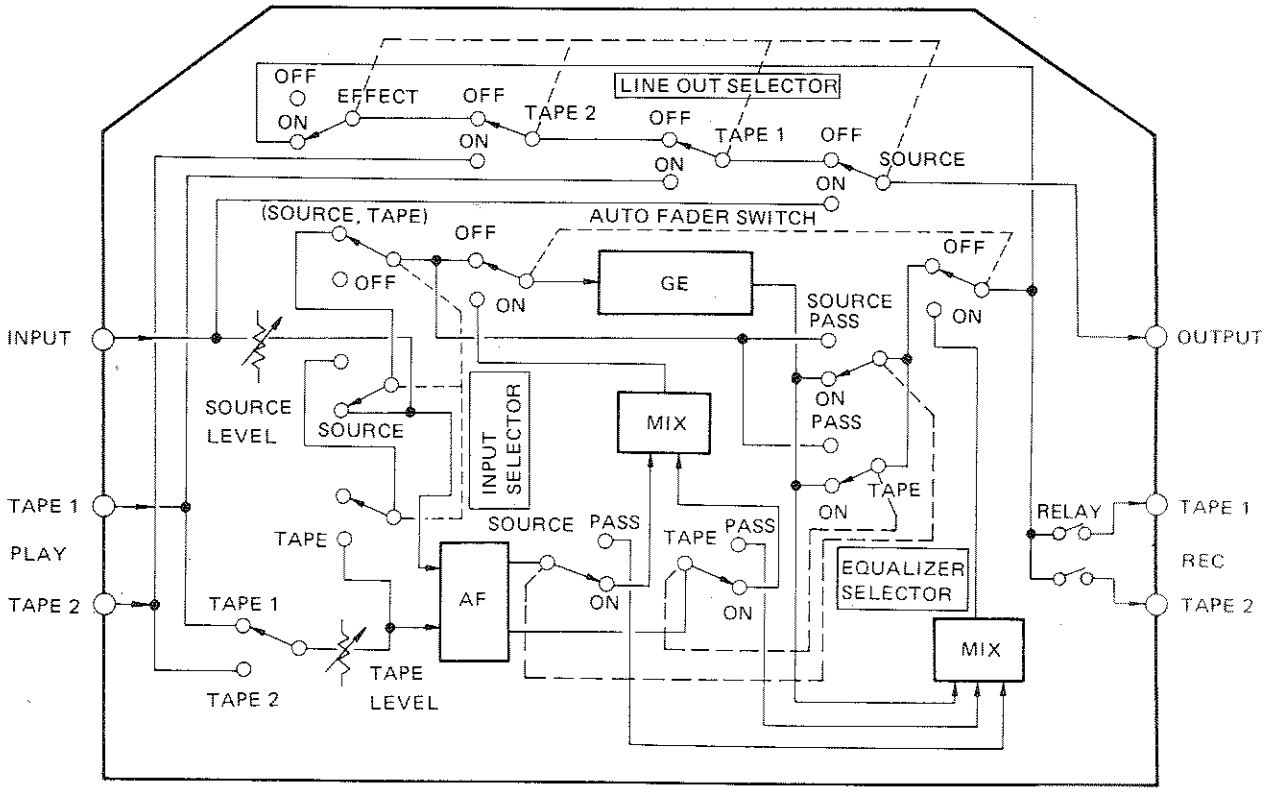
Power Requirements
KU, KC models ..... AC 120 Volts, 60 Hz
S, S/G models
... ~ AC 110 V/120 V/220 V/240 V (switchable), 50/60 Hz
HB model ..... a.c. 240 Volts ~ 50/60 Hz
YP model ..... a.c. 240 Volts ~ 50 Hz
Power Consumption
KU, KC models ..... 40 Watts
S, S/G models ..... 34 Watts
HB, YP models ..... 40 Watts
Dimensions ..... 420(W) x 131(H) x 351(D) mm
16-9/19(W) x 5-3/16(H) x 13-13/16(D) in.
Weight ..... 7.2 kg (15 lb 14 oz)

ACCESSORIES

Pin-plug connecting cords 2
Operating Instructions 1

NOTE:
Specifications and design subject to possible modification without notice, due to improvements.

BLOCK DIAGRAM



TROUBLESHOOTING

If you think that the unit is malfunctioning, perform the following checks.
Often incorrectly following operating procedures are to blame. The cause may also lie outside the unit itself. Check the other components and electrical appliances being used at the same time.
If the problem is not remedied after following the checklist below, contact your dealer or the nearest Pioneer Service Center.

Trouble	Possible cause	Remedy
No sound from speakers.	1. Is power switch OFF? 2. Is power cord disconnected? 3. Is INPUT SELECTOR "OFF"? 4. Is any connecting cord disconnected from input or output terminal? 5. TAPE or SOURCE input level control is lowered to "−∞" position?	1. Set power switch to ON. 2. Connect power cord properly to power outlet. 3. Press "SOURCE". 4. Connect pin plugs of cord properly. 5. Adjust level control.
Graphic equalizer does not function.	1. Are graphic equalizer selectors TAPE and SOURCE at PASS? 2. Is stereo amplifier's ADAPTOR/TAPE 2 switch at OFF? 3. Is switch other than "EFFECT" of LINE OUT SELECTOR pressed?	1. Press selector corresponding to mode in which equalization effect is to be added. 2. Press stereo Amplifier's ADAPTOR/TAPE 2 switch or TAPE monitor switch ON. 3. Press "EFFECT".

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<85D00M2S10> Printed in Japan <ARB-573-E>